

CLAIMS

What is claimed is:

- 1 1. A speech-based processing system comprising:
 - 2 a database of PIM data associated with a user;
 - 3 a set of language models;
 - 4 a learning unit to provide language models of said set of language models
 - 5 based on the PIM data by employing a language model learning algorithm;
 - 6 a recognition server to recognize an utterance of the user by using one of
 - 7 the language models; and
 - 8 a speech application to identify and access a subset of the PIM data
 - 9 specified by the utterance by using a result of recognizing the utterance.
- 1 2. A speech-based processing system as recited in claim 1, wherein the utterance
 - 2 comprises a short reference to said subset of the PIM data, said short reference
 - 3 consisting of less than all of said subset of the PIM data.
- 1 3. A speech-based processing system as recited in claim 1, wherein the learning
 - 2 unit is configured to employ the language model learning algorithm periodically
 - 3 to provide language models based on the PIM data.
- 1 4. A speech-based processing system as recited in claim 1, wherein the learning
 - 2 unit is configured to employ the language model learning algorithm on-the-fly to
 - 3 provide a language model based on the PIM data during a session with the user.

1 5. A speech-based processing system as recited in claim 1, wherein the language
2 model learning algorithm uses grammar induction.

1 6. A speech-based processing system as recited in claim 1, wherein the language
2 model learning algorithm trains statistical language models.

1 7. A speech-based processing system as recited in claim 1, wherein the speech
2 application and the learning unit comply with a common set of APIs designed
3 for accessing PIM data.

1 8. A speech-based processing system as recited in claim 1, wherein the PIM data
2 is provided in one or more XML documents.

1 9. A speech-based processing system as recited in claim 1, wherein the learning
2 unit comprises a plurality of modules, each module containing a set of heuristics
3 tailored for acquiring language models for one of a plurality of types of PIM
4 data.

1 10. A speech-based processing system as recited in claim 9, wherein the plurality
2 of types of PIM data comprises personal address book information.

1 11. A speech-based processing system as recited in claim 9, wherein the plurality
2 of types of PIM data comprises personal calendar information.

1 12. A speech-based processing system as recited in claim 9, wherein the plurality
2 of types of PIM data comprises information from email messages of the user.

1 13. A speech-based processing system comprising:
2 a database of PIM data associated with a user;
3 a set of language models;
4 means for employing a language model learning process to provide
5 language models of said set of language models based on the PIM data;
6 means for recognizing an utterance of the user based on one of the
7 language models, the utterance comprising a short reference to a subset of the
8 PIM data; and
9 means for identifying and accessing the subset of the PIM data specified
10 by the utterance based on a result of recognizing the utterance.

1 14. A speech-based processing system as recited in claim 13, wherein the means
2 for employing a language model learning process comprises a plurality of
3 modules, each module containing a set of heuristics tailored for acquiring
4 language models for one of a plurality of types of PIM data.

1 15. A speech-based processing system as recited in claim 13, wherein the means
2 for employing a language model learning process comprises means for
3 periodically providing language models based on the PIM data.

1 16. A speech-based processing system as recited in claim 13, wherein the means
2 for employing a language model learning process comprises means for providing
3 a language model based on the PIM data on-the-fly during a session with the
4 user.

1 17. A speech-based processing system as recited in claim 13, wherein the
2 language model learning process uses grammar induction.

1 18. A speech-based processing system as recited in claim 13, wherein the
2 language model learning process trains statistical language models.

1 19. A speech-based processing system comprising:
2 a database of PIM data associated with a user;
3 a set of language models;
4 a language model server including
5 a learning unit to provide the set of language models based on the
6 PIM data by employing a language model learning algorithm, and
7 a look-up unit to look-up and select one of the language models
8 based on a specified identity of the user;
9 a recognition server to recognize an utterance of the user according to the
10 selected language model; and

11 a speech application to trigger operation of the look-up unit and to
12 identify and access a subset of the PIM data specified by the utterance using a
13 result of recognizing the utterance.

1 20. A speech-based processing system as recited in claim 19, wherein the
2 utterance comprises a short reference to said subset of the PIM data, said short
3 reference consisting of less than all of said subset of the PIM data.

1 21. A speech-based processing system as recited in claim 19, wherein the
2 learning unit comprises a plurality of modules, each module containing a set of
3 heuristics tailored for one of a plurality of types of PIM data.

1 22. A speech-based processing system as recited in claim 19, wherein the
2 learning unit is configured to employ the language model learning algorithm
3 periodically to provide language models based on the PIM data.

1 23. A speech-based processing system as recited in claim 19, wherein the
2 learning unit is configured to employ the language model learning algorithm on-
3 the-fly to provide a language model based on the PIM data during a session with
4 the user.

1 24. A speech-based processing system as recited in claim 19, wherein the
2 language model learning algorithm uses grammar induction.

1 25. A speech-based processing system as recited in claim 19, wherein the
2 language model learning algorithm trains statistical language models.

1 26. A speech-based processing system as recited in claim 19, wherein the speech
2 application and the learning unit comply with a common set of APIs for
3 accessing PIM data.

1 27. A speech-based processing system as recited in claim 1, wherein the PIM
2 data is provided in one or more XML documents.

1 28. A speech-based processing system comprising:
2 processor means for executing software; and
3 storage means accessible to the processor means for storing software, the
4 storage means having stored therein a learning unit to learn a set of language
5 models based on a set of PIM data and a speech application to access a subset of
6 the PIM data specified by a short reference to said subset uttered by a user, by
7 using a result of recognizing the utterance.

1 29. A speech-based processing system as recited in claim 28, wherein the
2 learning unit comprises a plurality of modules, each module containing a set of
3 heuristics tailored for acquiring language models for one of a plurality of types
4 of PIM data.

1 30. A method of facilitating speech recognition comprising:

2 using an automated language model learning process to acquire a set of
3 language models based on PIM data associated with a user;
4 recognizing an utterance by the user by using one of the language models;
5 and
6 using the recognized utterance of the user to identify and access a subset
7 of the PIM data.

1 31. A speech-based processing system as recited in claim 30, wherein the
2 utterance comprises a short reference to said subset of the PIM data, said short
3 reference consisting of less than all of said subset of the PIM data.

1 32. A method as recited in claim 30, wherein said using an automated language
2 model learning process comprises using a plurality of modules of the automated
3 language model learning process to acquire the set of language models based on
4 PIM data associated with the user, wherein each module contains a set of
5 heuristics tailored for a particular type of PIM data.

1 33. A method as recited in claim 30, wherein said using an automated language
2 model learning process comprises periodically providing language models based
3 on the PIM data.

1 34. A method as recited in claim 30, wherein said using an automated language
2 model learning process comprises providing a language model based on the PIM
3 data on-the-fly during a session with the user.

1 35. A method as recited in claim 30, wherein the language model learning
2 process uses grammar induction.

1 36. A method as recited in claim 30, wherein the language model learning
2 process trains statistical language models.

1 37. A method of facilitating speech recognition comprising:
2 using an automated language model learning process to acquire a set of
3 language models based on PIM data associated with a user;
4 recognizing an utterance by the user by using one of the language models;
5 and
6 using a speech application to identify and access a subset of the PIM data
7 based on the recognized utterance.

1 38. A method as recited in claim 37, wherein the utterance comprises a short
2 reference to said subset of the PIM data, said short reference consisting of less
3 than all of said subset of the PIM data.

1 39. A method as recited in claim 38, wherein said using an automated language
2 model learning process comprises using a plurality of modules of the automated
3 language model learning process to acquire the set of language models based on
4 PIM data associated with the user, wherein each module contains a set of
5 heuristics tailored for one of a plurality of types of PIM data.

1 40. A method as recited in claim 38, wherein said using an automated language
2 model learning process comprises periodically providing language models based
3 on the PIM data.

1 41. A method as recited in claim 38, wherein said using an automated language
2 model learning process comprises providing a language model based on the PIM
3 data on-the-fly during a session with the user.

1 42. A method as recited in claim 38, wherein the language model learning
2 process uses grammar induction.

1 43. A method as recited in claim 38, wherein the language model learning
2 process trains statistical language models.

1 44. A speech-based processing system as recited in claim 38, wherein the
2 automated language model learning process and the speech application are each
3 compliant with a set of APIs for accessing PIM data.

1 45. A speech-based processing system as recited in claim 38, wherein the PIM
2 data is provided in one or more XML documents.